IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants :	Stephen L. Buchwalter, et al.	**Examiner:**	Khiem D. Nguyen
Serial No.:	09/782,494	**Art Unit:**	2823
Filed:	February 13, 2001	**Docket:**	YOR920000745US1(14029)
For:	BILAYER WAFER-LEVEL UNDERFILL	**Dated:**	December 23, 2003

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

DECLARATION PURSUANT TO 37 C.F.R. §1.131

Sir:

Stephen L. Buchwalter, David Danovitch, Fuad Doany, Claudius Feger, Peter A. Gruber, Nancy C. LaBianca, hereby declare that:

1. We are some of the inventors named in U.S. Patent Application Serial No. 09/782,494 filed February 13, 2001.

2. The remaining joint inventor Revathi Iyenger is no longer affiliated with International Business Machines Corp., the assignee of U.S. Patent Application Serial No. 09/782,494, and despite efforts was unavailable for signature in the present affidavit.

3. We made the invention, which is disclosed and claimed in the present application, in the United States, prior to February 2, 2001, which date is the effective U.S. filing date of U.S. Patent Application Publication Number 2002/0105092 to Coyle ("Coyle").

4. As evidence of the completion of said invention prior to the effective U.S. filing date of Coyle, annexed hereto is Exhibits A(i), A(ii) and B. Exhibit A(i) consists of a true photocopy of the invention disclosure which evidence that the claimed invention was developed in laboratories at IBM Corporation in Yorktown Heights, NY prior to the February 2, 2001 effective U.S. filing date of Coyle. Exhibit A(ii) is a photocopy of "blwluf.prz" the file referenced on Page 3 of the invention disclosure in Exhibit A(i). Exhibit B is a true photocopy of an internal presentation of the subject matter of the present application, which includes a optical micrograph of the conductive bump material and bilayer underfill produced in accordance with the claimed invention. The activity contributing to the development of the claimed invention was conducted under our direct supervision and control prior to the effective U.S. filing date of Coyle. Dates and names have been redacted in the preparation of the photocopies contained in the attached exhibits.

5. The claimed invention is directed to microelectronic packaging, and more particularly to a microelectronic interconnect structure and a method of fabricating the same. The inventive method which utilizes a bilayer polymeric underfill eliminates separate underfill steps that are typically required in prior art methods of fabricating microelectronic interconnect structures.

6. Exhibit A(i) is a photocopy of the original invention disclosure that recognized that a bilayer wafer underfill may be employed to overcome the deficiencies of prior underfill methods, which often result in non-uniform and incomplete underfill that may lead to a shortened fatigue life. Exhibit A(ii) is a photocopy of the attachment referenced on Page 3 of the invention disclosure. Exhibit A(ii) includes figures that illustrate the various steps and elements of the claimed method that correspond to the text included on Pages 2 and 3 of the invention disclosure in Exhibit A(i).

Referring to Exhibit A(ii), FIG. 1(a) illustrates a silicon wafer with ball limiting metallurgy (BLM) that may function as interconnect pads. FIG. 1(b) depicts applying a first underfill layer, i.e., polymeric, on a surface of a semiconductor wafer, as recited in step (a) of Claims 1 and 21. FIG. 1(c) depicts patterning the polymeric material to provide openings in the first underfill layer and exposing the area above the wafer pads, as recited in step (b) of Claims 1 and 21. FIG. 2(a) illustrates applying solder, also referred to as conductive bump material, into the openings, as recited in step (c) of Claims 1 and 21. Turning now to FIG. 2(b), a second polymeric material is deposited atop the first polymeric material and the conductive bump material, as recited in step (d) of Claims 1 and 22. FIG. 3(a) depicts a chip formed by dicing a semiconductor wafer, as recited in step (e) of Claims 1 and 21. FIG. 3(c) depicts bonding at least one of the chips to an external surface, where during bonding the conductive bump material penetrates the second polymeric material and contacts a surface of the external substrate, as recited in step (f) of Claims 1 and 21. As shown, the invention disclosure referenced as Exhibit A(i) discloses the bilayer underfill method of the present invention.

7. Exhibit B provides further evidence of reduction to practice of the present invention prior to February 2, 2001, which date is the effective U.S. filing date of U.S. Patent Application Publication Number 2002/0105092 to Coyle ("Coyle"). Exhibit B is a photocopy of an internal presentation of the subject matter of the application at issue that was given prior to the effective date of the Coyle reference. Included on Page 18 of the presentation in Exhibit B is an optical micrograph of the conductive bump material deposited within the openings of a first polymeric material, where during bonding to an external surface (substrate) the conductive bump material penetrates a second polymeric material and contacts the surface of the external substrate. Still referring to Exhibit B, an optical micrograph of the conductive bump material in conjunction with a B-staged polyimide adhesive (second polymer material) is also included on Page 14 of the presentation.

8. We further declare that all statements made herein of my knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: _____ _____

Stephen L. Buchwalter

Dated: _____ _____

David Danovitch

Dated: _____ _____

Fuad Doany

Dated: _____ _____

Claudius Feger

Dated: _____ _____

Peter A. Gruber

Dated: _____ _____

Nancy C. LaBianca